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FREQUENCY AND CHARACTERISTICS OF METABOLIC SYNDROME IN PATIENTS WITH ACUTE CORONARY SYNDROME AMONG PAKISTANI ADULTS

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ABSTRACT

Objective: The aim of our study was to determine the frequency of metabolic syndrome (MS) and to evaluate the distribution of its components in patients with acute coronary syndrome (ACS) among Pakistani adults.

Methodology: This descriptive cross sectional study was conducted in Division of cardiovascular medicine and interventional Cardiology, Allama Iqbal Medical College/Jinnah Hospital, Lahore from October 2011 to December 2011. Patients of either gender and from 20 to 75 years of age admitted with ACS via emergency department were recruited after an informed consent. Overall frequency of metabolic syndrome was evaluated in these patients. In addition frequency of individual components of metabolic syndrome as risk factor for acute coronary syndrome was also calculated. Data was analyzed in SPSS version 17.

Results: The metabolic syndrome was present in 32% of patients and was more frequent A total of 350 patients with acute coronary syndrome were studied in men than women (75% vs. 25%). The most frequent component of metabolic syndrome as a risk factor for ACS was hypertension seen in 52.6 % patients, followed by diabetes mellitus in 42.8%, abdominal obesity in 41.2%, hypertriglyceridemia in 40.0% and low HDL in 31.7 % of patients.

Conclusion: Metabolic syndrome has high frequency in patients with acute coronary syndrome, especially in men. The most frequent components are Hypertension and Diabetes.

Key Words: Metabolic Syndrome, Acute Coronary Syndrome, Diabetes Mellitus, Abdominal Obesity

INTRODUCTION

The metabolic syndrome (MS) is a cluster of metabolic abnormalities including abdominal obesity (AO), Hypertension (HTN), Diabetes Mellitus (DM), atherogenic Hpertriglyceridemia (HTG) and low high density Lipoprotein (HDL-C).[1] Other names used for this syndrome are Syndrome X, the insulin resistance syndrome, the deadly quartet or the obesity dyslipidemia syndrome.[2] Diet rich in cholesterol and westernization of lifestyle have given rise to this problem. MS is a serious worldwide health problem and these metabolic risk factors lead to vascular endothelial dysfunction, which eventually promote the risk of atherosclerotic cardiovascular disease (CVD) especially in western countries.[3] CVD is the leading cause of mortality, which accounts for about 30% deaths per year.[4] A basic component of MS is insulin resistance that leads to high level of insulin in the body, which itself is atherogenic in nature. Therefore individuals with MS are at increased risk of coronary artery disease (CAD).[5]

Several studies have been conducted during the last decade regarding prevalence, pathology, clinical behavior and critical outcomes of MS in western part of the world. A local study showed frequency of MS around 31% (32% in men and 28% in women) in patients of ACS.[6] Numerous studies in the western societies have shown that individual components of MS are directly related to increased risk of ischemic heart disease,[7,8] but in our part of the world only small data is available regarding this association. Moreover the relation between CAD and MS (as well as its individual components) varies on ethnic origin and behavior of metabolic abnormalities is different in our population.[9]

The aim of our study was to determine the frequency of metabolic syndrome and to evaluate the distribution of its components in patients with acute coronary syndrome among Pakistani adults.

METHODOLOGY

This descriptive cross sectional study was conducted in Division of cardiovascular medicine and interventional Cardiology, Allama Iqbal Medical College/Jinnah Hospital, Lahore from October 2011 to December 2011. 350 patients of either gender and from 20 to 75 years of age admitted with ACS (as per operational definition) via emergency department were recruited after an informed consent. The study excluded those patients who refused to give consent for study. All the relevant data was filled on to the pre-designed Performa. The frequency and characteristics of MS among this population of patients were determined.

OPERATIONAL DEFINITIONS

Acute coronary syndrome: Patients with either Un-stable angina, Non ST-elevation MI or ST-elevation MI.

Un-stable angina : Recurrent ischemic symptoms at rest, along with ST depression > .05 mV in two contiguous ECG leads without raised cardiac biomarkers, Non ST-elevation MI or ST-elevation MI.[10]

Non ST-elevation MI: Raised biomarkers (CPK > three times of upper limit (25-195 U/L) , CKMB > three times of upper limit (24 U/L) , TROPONIN-T result +VE by kit method in the presence of ischemic chest pain or ST depression or T-wave inversion in two contiguous leads. [10]

ST-elevation MI: ST elevation in two contiguous ECG leads (> 2mm in chest leads , > 1mm in limb leads) in the presence of one of the following features.[10]

a) Raised biomarkers (CPK > three times of upper limit 25-195 U/L , CKMB > three times of upper limit 24 U/L, TROPONIN-T result +VE by kit method)

b) Ischemic chest pain

Metabolic Syndrome: presence of 3 or more out of 5 (NCEP ATP III Criteria)[11]

a) Waist circumference:

Men — Equal to or greater than 102 cm

Women — Equal to or greater than 88 cm

b) Triglycerides:

Equal to or greater than 150 mg/dL

c) Reduced HDL:

Men — Less than 40 mg/dL

Women — Less than 50 mg/dL

d) Elevated blood pressure: Equal to or greater than 130/85 mm Hg 1st reading on presentation (or known hypertensive already on medications

e) Elevated fasting glucose: ≥110 mg/dL on morning of admission (or known diabetic already on medications)

Data was analyzed in SPSS version 17. Numerical variables like age were presented by mean and standard deviation. Frequency and percentages were calculated for gender, metabolic syndrome, obesity, DM, HTN, dyslipidemias in ACS. Distribution of un-stable angina, ST-elevation MI and Non ST-elevation MI was also elaborated among the ACS patients.

RESULTS

The study included 350 patients of ACS. Among these 252 (72%) were male. 20.3% were in age group 35-55 years and 79.7% were in age group 55-75 years. Mean age was 60.2 ±6.49.

The minimum age was 35 years and maximum age was 75

Table 1: Frequencies of Various Risk Factors for CVD in ACS Patients

Risk Factors[a]	Responses		Percent of Cases
	N	Percent	
Abdominal Obesity	134	19.8%	41.2%
Diabetes Mellitus	139	20.5%	42.8%
Hypertension	171	25.3%	52.6%
Low HDL	103	15.2%	31.7%
High Trigylcerides	130	19.2%	40.0%
Total	677	100.0%	208.3%

a. Dichotomy group tabulated at value 1

years. MS was present in 32% of total ACS patients and was more frequent in men than women (75% vs. 25%). Among the total male population 33.3% were affected by MS whereas among the total female population 28.6% suffered from metabolic syndrome.

The frequency of various components of MS as CV risk factors in entire of the ACS population was as follow: The most frequent component of MS as a risk factor for ACS was Hypertension (52.6 % patients), followed by Diabetes in 42.8%, Abdominal Obesity in 41.2%, Hyper-triglyceridemia in 40.0% and Low HDL in 31.7 % of patients (Table 1).

The frequency of MS in various types of ACS was as follow: 34.0% in NSTEMI patients followed by 32.5% in STEMI and 24.1% in UA patients (Table 2).

DISCUSSION

The epidemiologists and physicians have acknowledged the importance of metabolic syndrome as extensive research work is being conducted on this subject. Metabolic syndrome and its five major coronary artery disease risk factors without any doubt lead to atherosclerotic arterial disease, eventually progressing to ischemic heart disease. A subset of Framingham study depicted that MS contributed to CVD and CAD 34% and 29% respectively in men and 16% and 8% respectively in women.[12] In our study we determined the frequency of metabolic syndrome in patients presenting with acute coronary syndrome. We found our study convenient and cost effective as we enrolled patients admitted in our hospital only. A reasonable study sample was taken to strengthen the results. Our study found the frequency of MS as 32% in ACS based on ATP III criteria. These results were similar to a local study which showed 31% frequency of MS in ACS patients.[6] This study was done in similar set of patients with comparable lifestyle and dietary habits and was based on ATP III criteria for diagnosis of MS. A report from National Health Statistics in US population showed 34% prevalence of MS in adults.[13] In European countries the estimated prevalence of MS was 23%, while in Canada its prevalence was 25% in population between age group 35 to 75 years.[14] The Indian population also showed prevalence of MS 29.9% in ACS patients based on ATP III criteria.[15] A recent Spanish study showed total prevalence of MS 50.9% in ACS population using ATP III guidelines for standardization.[16] In another local study there was a higher prevalence of MS (around 55%) in ACS patients but it was based on modified ATP III criteria (waist circumference > 90 cm in men and >80 cm in women)[17] and expectedly the number of patients with diagnosis of MS was higher due to lowering the waist circumference criteria. However this study also demonstrated a higher frequency of MS in men than women as shown by our study (75% vs 25%). On the other hand Zaliunas et al, found MS more prevalent in women than men (70.2% vs. 52.6%) according to modified NCEP III criteria and these results were in accordance with a Spanish study done by Jover et al.[18]

We concluded Hypertension as the most frequent component of MS as a risk factor for ACS (52.6% patients) followed by Diabetes in 42.8% patients according to ATP III criteria. While in Framingham study the most frequent components contributing to CVD were HTN (33%) and low HDL cholesterol (25%).[12] In their study Zaliunas et al, showed AO as the most frequent component of MS (86.4% and 84.5% in men and women respectively) followed by HTG in three-fourths of the patients.[18] While in a study by Jover et al, the most frequent components of MS associated with ACS were HTG (66.2%) and low HDL-C (60.1%).[16]

The significant prevalence of this health disorder as revealed by our study as well other research work demands much larger studies to estimate the actual magnitude of the problem. Furthermore programs regarding public awareness of MS and its association with CVD are required in order to early recognition and treatment of this problem. Exercise as one of the lifestyle modifications leads to weight

Table 2: Frequencies of MS in Various Types of ACS Patients

ACS Type		Metabolic Syndrome		Total
		Yes	No	
STEMI	Count	89	185	274
	% within ACS	32.5%	67.5%	100.0%
Non STEMI	Count	16	31	47
	% within ACS	34.0%	66.0%	100.0%
Unstable Angina	Count	7	22	29
	% within ACS	24.1%	75.9%	100.0%
Total		112	238	350
		32.0%	68.0%	100.0%
Pearson Chi-Square =.943a P = .624				

loss which in turn amends the components of MS such as loss of abdominal fat, reduction of blood pressure, increasing insulin sensitivity, lower triglyceride levels, and increasing HDL cholesterol.

CONCLUSION

Our study concluded that metabolic syndrome has high frequency in patients with acute coronary syndrome, especially in men. The most frequent components of metabolic syndrome in ACS were Hypertension and Diabetes.

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